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cell surfaces may have electromotor properties similar in certain respects to those of metallic surfaces has long been familiar to physiologists; and the so-called "membrane theory" (or theories) of the bioelectric potentials, which originated in a suggestion of Ostwald in 1890 and has been developed in considerable detail by Bernstein, Höber and others, has referred the physiological variations of potential to variations of permeability or to other changes in the plasma-membrane. It seems best, however, to avoid for the present too special conceptions of the precise nature of the processes concerned in these phenomena and to regard the latter from a broader and more generalized point of view. Variations of phase-boundary potentials, with associated or dependent chemical effects, appear to constitute the general type of phenomenon involved. More recently the work of Haber, Beutner and especially of Loeb and Beutner in collaboration, has demonstrated many fundamental resemblances between such potentials and the bioelectric potentials, and is of the highest interest in relation to this general problem. The work of Loeb and Beutner, together with that of Macdonald, indicates that organic membranes and cell-surfaces behave as if reversible (in the electrochemical sense) to cations as a class; in this respect they resemble the surfaces of solutions of lipoids in organic solvents; and it seems probable that the demarcation-current potentials are thus to be explained. I am inclined, however, in view of the conditions in passive iron as well as for more purely biological reasons, to regard the local bioelectric circuits accompanying normal cell activity as representing primarily some type of oxidation reduction element. In general the physiological effects observed at the respective regions where the electric current enters and leaves the cell-surface are *opposite* in character, and the same must be true of the underlying chemical or metabolic processes. Oxidation at one area, simultaneously with reduction at another area—these chemical changes involving synthesis as well as decomposition—seems to be a more probable source of the normal currents of

action, especially when the dependence of vital phenomena on oxidation and synthesis and the interdependence of the two latter processes are considered. Further discussion of the possible relations between the bioelectric processes and cell-metabolism, with a fuller account of the facts described in this article, must be reserved for a more complete paper.

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### THE INTER-ALLIED SCIENTIFIC FOOD COMMISSION<sup>1</sup>

THE Inter-Allied Scientific Food Commission now sitting in London has already at previous meetings accomplished a good deal of work, and if its recommendations are carried out, the provisioning of allied countries will be placed on a sound scientific basis. That its recommendations will be carried out seems to be more or less guaranteed by the fact that it was established as a result of a decision of the Inter-Allied Conference held in Paris last November. The Conference directed that the inter-allied scientific commission should consist of representatives of France (Professors Gley and Langlois), Italy (Professors Botazzi and Pagliani), United States (Professors Chittenden and Lusk), and the United Kingdom (Professors E. H. Starling and T. B. Wood). It was instructed to meet periodically in order to consider from a scientific point of view the food problems of the Allies and in agreement with the inter-allied executives to make proposals to the allied Governments. The commission held its first meeting in Paris on March 25, and its second in Rome on April 29. Before its present meeting in London a representative of Belgium, Professor Hulot, was added. A memorandum upon the work of the commission, furnished to us by the food controller, contains some particulars enlarging the information published in previous issues.

At its first meeting last March in Paris the commission came to an agreement as to the minimum food requirements of the average man. It was laid down that for a man weigh-

<sup>1</sup> From the *British Medical Journal*.

ing 70 kilos, or 154 lb., doing average work during eight hours a day the food as purchased should have an energy value of 3,300 calories a day, but that a reduction of 10 per cent. could be supported for some time without injury to health. The commission accepted the figures of Professor Lusk, one of the representatives of the United States, for the proportion to be assigned to women and to children of different ages. At the second meeting, in Rome, the metric ton (a metric ton is 0.9842 ton British) was adopted as the unit for estimating the weights of the various foods produced in each allied country. A "man value"—that is to say, the number of average men equivalent to the population of each of the allied countries—was established, and was taken as a basis for calculating the amount of food to be provided for the adequate nourishment of the total population of each country. An estimate was then formed of the home production of the soil furnished by each allied country in 1918-19 to serve as a basis for determining the amount of food available for men and animals, respectively, in each country.

It was not thought desirable to fix a minimum meat ration, in view of the fact that no absolute physiological need exists for meat, since the proteins of meat can be replaced by other proteins of animal origin, such as those contained in milk, cheese and eggs, as well as by proteins of vegetable origin. It was, however, considered desirable to fix a minimum ration of fat; this it was decided should be 75 grams—about 2½ oz. per average man a day. It is to be noted that the fat ration may be made up from fats partly of vegetable origin and partly of animal origin, and the commission expresses the opinion that if the amount of fat of vegetable origin was found to be insufficient it might be necessary to maintain a certain stock of animals to make good the deficit.

The commission has recommended that the maximum possible proportion of all cereals except oats should be reckoned in when calculating the amount of calories available for man. As to milling, it has advised that a

uniform extraction of 85 per cent. should be adopted in all the allied countries; this will vary from 80 per cent. in summer to 90 per cent. in winter, and will apply to the United States only as regards their internal consumption, and then only in case of scarcity. While man should always take precedence over animals in the allocation of food by governments, it is recognized that the methods adopted for reserving the maximum possible proportion of the cereals for the use of man may vary in each country. The opinion is therefore expressed that in fixing prices it is the prices of animal products which should be limited rather than those of such vegetable products as may serve equally well for feeding men and animals. The production of veal, pork and poultry at the expense of other food immediately available for man should therefore be discouraged and this may best be done by fixing prices for those animal products which will make it unprofitable for the producer to feed the animals on cereals. The chief subject now under consideration is the examination of statistics which will render it possible to ascertain the calorie value of the home production of each of the allied countries. The comparison of these figures with the needs in calories of the population of each country will enable the commission to deduce the amount of imports necessary for the maintenance of the population, or the exportable surplus, as the case may be.

The commission has also expressed the opinion that any propaganda having for its object the encouragement of food production and of economy in the use of food should be organized and directed by men of science well acquainted with the subject. The members of the commission itself fulfil this condition, to the importance of which we had occasion some time ago to call attention, for this elementary principle was at first neglected in this country. It appears that the truth of this principle is beginning to be recognized in Germany, where voices are being raised in favor of consultation of scientific and medical experts by the authorities.